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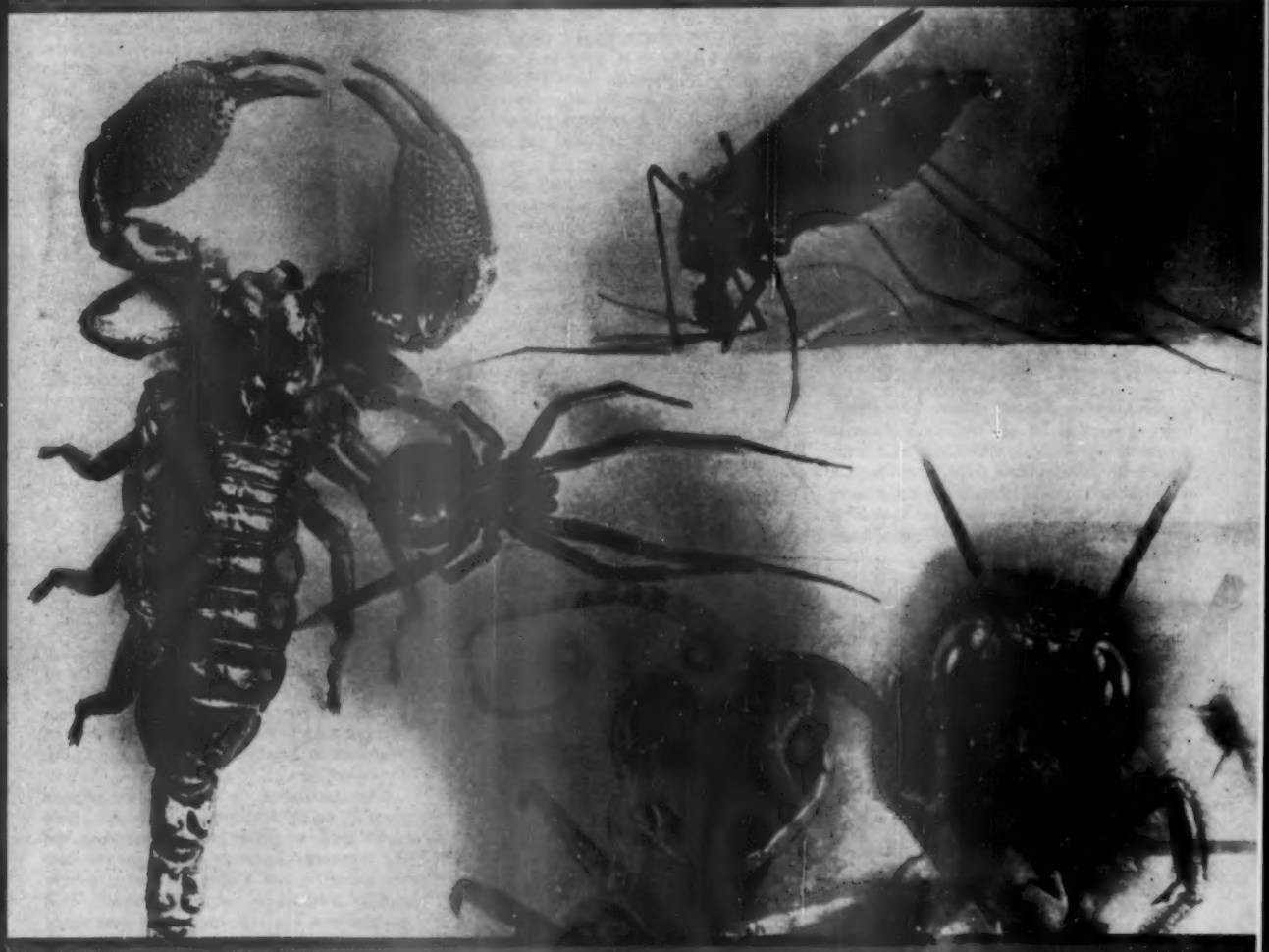
THE WEEKLY SUMMARY OF CURRENT SCIENCE



Stingers Can Kill

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A SCIENCE SERVICE PUBLICATION

TECHNOLOGY

Tappers Called Ingenious

House investigating committee cannot show some of the devices developed by professional wiretappers. The equipment is similar to secret military devices.

➤ PROFESSIONAL WIRETAPPERS have developed equipment for their trade so advanced and ingenious that some systems are similar to secret military devices.

William Foley, chief counsel for the House Judiciary Subcommittee, now investigating the wiretap problem, said this poses a problem for the congressional investigating group holding open hearings.

Some of the equipment, although developed by the commercial wiretappers, cannot be shown for security reasons.

About half a dozen large professional organizations in the country specialize in wiretapping, he told SCIENCE SERVICE. They have devices that "shocked" Mr. Foley when he saw them perform. These systems defy detection. The station where the conversations are monitored can be as far as a half mile away.

The outfits that use these and other devices that resemble security-cloaked systems do not operate illegally, he pointed out. They do such jobs as inter-office taps requested by the firm.

Organizations that specialize in such work may use ultra-modern equipment, but engineers point out that anybody with a smattering of electronic theory and some knowledge of telephone circuits could make an effective tap. All that is needed is some wire, a condenser, a resistor, an amplifier and earphones. These are common, inexpensive items.

Physical contact between the tap wire and the telephone line is not necessary, they say, since the electric pulses can be picked up by merely placing the tap line close to the telephone wires. Even the crude direct contact taps produce no clicks, phhts or other audible evidence if the tap is done carefully and with the correct equipment.

Physical inspection of the telephone line is the only reliable method of making sure that no one is listening in.

The common places for taps are at the telephone receiver, along the wire that goes from the house to the terminal box outside, the terminal box itself, and the several bridging points where additional lines are added to the cable. At the first three places, the tapper takes a chance of being seen laying his line. But there is not much danger since he can impersonate a repairman to gain access to these points.

To tap a bridging point, where sometimes thousands of individual telephone lines are connected to numbered posts inside the box, he must know the numbers identifying the line he wants. This can be learned by impersonating an employee and calling the telephone repair office for the information.

The theory of tapping is basically simple. Current, pulsing to the sound vibrations of the voice, passes through a pair of wires in a cable that eventually leads to the main telephone office. The tappers must pick up the fluctuations in this current without interfering with its flow. This can be done by connecting his two wires directly to the two from the phone he wishes to tap. In this case a resistor is used in the tapper's line so that it will not draw off too much current. Now he has the same current flowing in his circuit in a weaker form which can easily be amplified and led into earphones.

The inductive tap, in which there is no direct contact between the tapper's wires and the telephone wires, is based on the principle that when one wire is placed near another it picks up fluctuations in current.

In either of these types of taps, the monitor need not be near the house. The conversation can be broadcast over a small radio transmitter from the basement of the house or the terminal box and picked up blocks away. This, however, would be an illegal radiotransmission.

Tapping, in itself, is not a crime, according to the Federal Communications Act of 1934, which stipulates that "no person not being authorized by the sender shall intercept any communication and divulge or publish" it. Thus to convict a person of this violation the prosecution must establish that a tapper told a third party what he heard. Mere tapping is just a misdemeanor in most states, Mr. Foley said.

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AGRICULTURE

Photo Chemical Proves Effective Weed Killer

➤ A LITTLE known darkroom chemical, aminotriazole, has been found to be an effective weed killer.

Previously used in the manufacture of photographic film, preliminary field tests reported show that the chemical is capable of destroying weeds, ranging all the way from quackgrass in corn and Canada thistle in pastures to poison ivy and some oaks.

Non-poisonous to humans and animals, aminotriazole kills weeds by interfering with their chlorophyll supply and starving them to death. In addition to its weed-killing potential, the chemical is equally effective in causing the leaves of cotton plants to drop off to make picking easier.

Discovery of the photographic chemical's use in agriculture was made by William Allen, chief agricultural formulating chemist of the American Chemical Paint Co., Ambler, Pa. The company will market the herbicide this year under an experimental label and the trade name Amizol.

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BOTANY

Diet for Home Plants

➤ PLANTS USED to decorate the home can be made to look better, if they are put on the right light and water diet.

In a series of experiments with 43 popular indoor plants, Dr. O. Wesley Davidson of Rutgers University, New Brunswick, N. J., found that plants can be "trained" to remain attractive when put on a strict water and light diet.

The water training or adaptation, means keeping the soil "moderately" dry, the research specialist in floriculture said. Double pots with moss in between was found to be an effective method of giving the plants only a small amount of water.

The light diet was based on 16 hours of artificial illumination a day. Fluorescent and incandescent light combined give the most desirable results for keeping leaves lustrous and maintaining slow growth.

The 43 plants, all of which were kept on a near-starvation water diet for 20 months, fell into three groups, depending upon the amount of light intensity each needs.

Seventeen plants, termed the hardiest, require from 15 to 25 foot-candles of light. These include Dumb-cane, three varieties of corn plants, two Chinese evergreens, and four kinds of Philodendron vines.

Sixteen other home plants survive looking their best with medium light intensity of from 25 to 50 foot-candles. Included in the second group were three more Chinese evergreens, a Diffenbachia, three varieties of Watermelon Begonias and two more Philodendron vines.

The last ten of the plants tested require from 50 to 100 foot-candles. These include three kinds of Ficus plants, cousins to the fig plants and India rubber plant, and two ivies, English and Maple Queen.

The foot-candle output per watt, it is pointed out, is much higher for fluorescent lights than for incandescent lights. Meters are available for measuring the intensity of artificial illumination in foot-candles.

Dr. Davidson also found that the use of fertilizers for indoor plants should be rationed along with the amount of light and water. No more than one-third the amount of fertilizer for the same plant growing outdoors is required for keeping the indoors inhabitants from becoming ungainly.

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PHYSICS

Stars and Atoms Linked

"Geon" suggested as a new approach to problem of unifying gravitational and electromagnetic phenomena, a goal of Einstein's unified field theory.

➤ A NEW body, the "geon," that ties together the familiar effects of gravitation and electromagnetism is the mathematical discovery of Dr. John A. Wheeler, professor of physics at Princeton University.

The geon is an attempt to unify in one concept the infinitesimal whirling world of the atom and the vast reaches of star-filled space.

Geons are "strange animals," Dr. Wheeler said. They cannot be seen nor touched. Although geons come in many sizes, only the very large ones have properties that are really well understood at present.

The name geon, he explained, is an abbreviation of the phrase, gravitational-electromagnetic entity. Large geons can be considered as lots of light in a ball held together by its own gravitational attraction, much as the earth, a ball of matter, is held together by gravity.

Dr. Wheeler bases his concept of the geon on the many parts of physics that are now well understood, such as the motions of planets, electromagnetic theory and Einstein's 50-year-old, "battle-tested" relativity theory.

His approach to the problem of unifying electromagnetic and gravitational phenomena is different from that tried by Prof. Albert Einstein. Development of a unified theory has been a major goal of physicists since about 1920.

Einstein attacks the synthesis in a purely mathematical model. Dr. Wheeler starts with what is now known and, based on this information, arrives at the properties of geons.

He used the University's electronic "brain" to help him in his calculations of their properties.

The simplest form of a geon, if drawn graphically, would look like a doughnut with a larger than usual hole. The doughnut itself would not be a continuous ring, but would consist of slices, in the ring shape but separated by gaps. This would picture the regions of strong electric field strength of the geon.

The radius of large geons is far larger than any known star. This stretches out the entity so thin that there is no known physical set-up to correspond to it.

Light from far-away stars passing close to the sun is bent by the solar gravitational field, showing the light responds to gravity's pull. The huge quantity of light in a ball that is a large geon would be held together by its own gravitational attraction, Dr. Wheeler found in his mathematical investigation of its properties.

He also discovered that geons have a "free parameter," that is, they can vary in size or in radius for a given mass.

Since light interacts with light, as geons wander around within the closed ball, some of them would eventually scatter out. Thus they are not completely stable and unchanging, but their life-times would be long enough to have lasted for the age of the universe, now thought to be about five billion years.

Dr. Wheeler would like to investigate the properties of geons in smaller regions, such as the whirling mist that is an atom, to find out what quantum effects would enter. A quantum is a discrete packet, or unit, of energy representing the smallest indivisible quantity. All forms of radiant energy are emitted in quanta, the sizes of each such unit being proportional to the frequency of the radiation. Energy can vary only in multiples of the elementary quantum.

Quanta put restraint on the possible masses geons can have. Dr. Wheeler estimates that the lower limit of a geon is about the mass of the sun itself.

Upper limit to geon size is "the linear extension of the universe itself," Dr. Wheeler stated in the *Physical Review* (Jan. 15), the journal for physicists in which he explained his theory.

For geons of small mass, quantum effects have to be taken into account. As the masses of geons become smaller, first one effect, previously unimportant, will become decisive, then another effect and so on, on down the mass scale.

Dr. Wheeler's theory is in line with the main current of modern thought about physics. That is, it is a particle theory rather than the field theory favored by Einstein.

There are only three mechanisms now known, Dr. Wheeler said, for the propagation of energy at the speed of light that do not have a characteristic mass associated with them. These are gravitation, electromagnetism and the neutrino. The concept of the geon is based on what scientists have learned about these three fields of force.

His ultimate aim, Dr. Wheeler said, is to get a predictable picture of the elementary particles that are now so puzzling to physicists.

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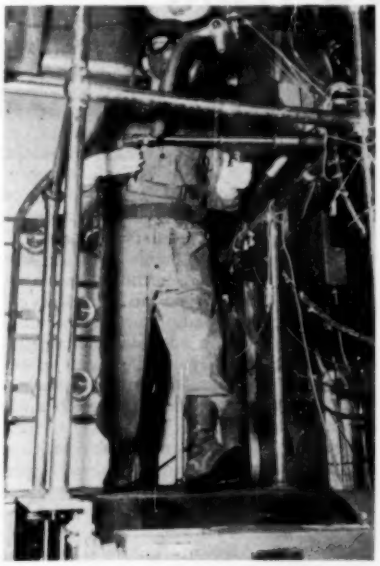

CHEMICAL WARFARE TEST— Approximately 20 soldier volunteers each month from the Second Army area will help test new Chemical Corps equipment and techniques for protection against chemical warfare. Soldier is shown on treadmill device to test effectiveness of gear under battle conditions. The experiments will be conducted at the Army Chemical Center, Edgewood, Md.

MEDICINE

Foresees New Health Group When TB Licked

➤ TUBERCULOSIS WIPED out "in the immediate future" and a new kind of local health agency supported by sale of Christmas seals are foreseen by Dr. Louis I. Dublin, statistician and consultant on health and welfare to the Institute of Life Insurance, New York.

What is left of tuberculosis can be wiped out in the immediate future through "the utilization of every ounce of skill and energy," Dr. Dublin declared at the meeting of the Onondaga Health Association in Syracuse.

He urged the National Tuberculosis Association and its thousands of affiliated societies to work vigorously to this end and then to approve the use of Christmas seals for "an ever-widening range of health activities."

"It would be nothing short of tragic if the Christmas seal withered as a source of funds along with the elimination of tuberculosis as a public health problem," he said.

"The local health agency I conjure up will have a number of divisions, each concerned with the principal conditions that call for preventive service under the direction of a highly competent and well-trained public health man. He will work directly with the local health officer and the local medical society, sharing in planning and acting as the interpreter to the people of the united effort to raise the level of health in the community.

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GEOLOGY

Rush on Uranium Maps

➤ URANIUM FEVER is causing healthier sales of Government geologic and topographic maps.

More maps of all kinds have been sold during January and February of this year than during the same period last year, and the U. S. Geological Survey reports that sales have been steadily rising. If the pace continues, it is expected that there will be at least a 20% increase in total distribution over the last previous record of 2,200,000 maps in 1954.

Indicative of the current map rush is the fact that the Survey people have a "best-seller" on their hands. A little over a month ago, 10,000 copies of MF 16, Mineral Investigations Field Studies of the Colorado Plateau, were published.

A check of the distribution centers for the Survey, at Washington, D. C., and Denver, Colo., shows that fewer than 3,000 copies of MF 16 remain in stock.

This rapid depletion in little more than a month is highly unusual for any map, distributors say.

Other maps have enjoyed similar popularity. Particularly the radioactivity maps that show where significant differences in radioactivity found by airborne survey occur over land.

Even topographical quadrangle maps, familiar to hunters, fishermen, surveyors and others, the maps responsible for more than 90% of the Survey's yearly sales, have been in increasing demand. These maps show the physical and cultural features of the land and are useful for the uranium hunter who uses them in his hunt for radioactive minerals much as the animal hunter does to keep from getting lost.

The U. S. Geological Survey, which is responsible for the nation's official geologic and topographic maps, sells the maps at prices ranging generally from 20 cents for the topographic maps to $2.50 for its geologic map of the entire United States.

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NUTRITION

Lysine-Fortified Milk

➤ UNDERWEIGHT BABIES with poor appetite will eat better and gain weight when their milk is fortified with lysine. This chemical is one of the essential amino acids and a building block of protein.

The good effects of adding this chemical to the underweight baby's food were reported by Drs. Anthony A. Albanese, Reginald A. Higgons, Gertrude M. Hyde and Louise Orto of St. Luke's Hospital, New York, in the *American Journal of Clinical Nutrition* (March-April).

Fifteen babies aged one to 25 months were given the lysine supplement in the form of a tasteless white powder called Lactofort by its manufacturers, White Laboratories, Inc., of Kenilworth, N. J. Lactofort also contains vitamins, iron and calcium.

The babies were getting standard fresh or evaporated milk formulas and other foods usually prescribed by New York pediatricians for babies of their ages. The lysine supplement was given for three to four weeks preceded and followed by equal periods without it as control.

Five of the babies showed marked improvement. Their appetites picked up and they gained weight. Six did not gain weight spectacularly, but chemical tests showed they were gaining strength and sturdiness. The remaining four showed no measurable improvement, but they had already been growing at a rate well above the average.

The lysine-fortified diets apparently are effective only in children who are not getting adequate nourishment from their food, Dr. Albanese pointed out.

The idea of adding lysine to the babies' diet came from earlier studies by Dr. Albanese and others showing that young infants need about twice as much of this in relation to another amino acid as young adults.

Dr. Albanese suggests that the nutritional value of many infant foods, including cow's milk, can be substantially improved by adding a little lysine. Failure to get enough of this amino acid on ordinary formulas may be what makes the baby's appetite poor. Poor appetite leads to eating less, so the amount of lysine consumed is further cut. Babies who are getting such protein foods as meat and egg in addition to their milk are getting more lysine, but some young babies seem to lack a digestive enzyme that would let them get the extra lysine out of the meat feeding.

For these the lysine supplement seems to be the answer. It also should be helpful for babies allergic to cow's milk. One such baby in the group studied was helped to better appetite and weight gain when the lysine was added to her milk substitute formula.

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GENERAL SCIENCE

National Academy Names Loyalty Group

➤ THE COMMITTEE of the National Academy of Sciences that will report to the White House on whether loyalty doubts should bar Government grants and contracts with scientists who are undertaking unclassified research will be headed by Dr. J. A. Stratton, vice-president and provost of the Massachusetts Institute of Technology.

Other committee members announced by Dr. Detlev Bronk, president of the Academy, are: Dr. Robert F. Bacher, California Institute of Technology physicist and former Atomic Energy Commissioner; Laird Bell, Chicago attorney who has been chairman of the University of Chicago's trustees; Dr. Wallace O. Fenn, University of Rochester School of Medicine physiologist; Dr. Robert F. Loeb, medical services director of New York Presbyterian Hospital; Dr. E. Bright Wilson, Harvard chemist, and President Henry M. Wriston of Brown University.

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ANTI-POLIO SHOTS—Millions of children all over the world will be vaccinated with the Salk polio vaccine, like this Venezuelan youth at Caracas, if final evaluation, due April 12, indicates it is effective against polio.

MEDICINE

Who Got Polio Vaccine?

Names of children who got real polio vaccine instead of dummy "shots" in trials last year to be in mails to health officers as results are announced.

➤ PARENTS SHOULD know by April 15 at the latest whether or not their children got the Salk polio vaccine in last summer's trials. They will learn this from their local health officers.

Some parents, of course, already know. Their children were the ones in communities where only vaccine was given.

In other communities some of the children who lined up for "shots" got a dummy, or placebo, fluid in the "shot," while others got the real vaccine. The code showing which was placebo and which vaccine in each case is being broken by Dr. Thomas Frahcis of the University of Michigan Polio Vaccine Evaluation Center at Ann Arbor, Mich.

Knowing how anxious parents are to learn whether their child was vaccinated, Dr. Francis has taken time as he broke the code, to prepare lists of names of children who got the vaccine, officials of the National Foundation for Infantile Paralysis who sponsored the trials told SCIENCE SERVICE.

No one but Dr. Francis knows yet the results of the vaccinations. He will report that at Ann Arbor on April 12. At the same time that he gives this report to an audience of scientists, the lists of names of children who got the vaccine last summer will be put into the mails.

The lists are being sent to the health officers who in turn will notify the parents of the children. Some health officers might telephone the news, others might send it by mail, still others might arrange to give out the information at the health department offices. Local newspapers will doubtless also publish the list.

Depending, presumably, on how close the children live to Ann Arbor, and local arrangements by the health officer, some children and their parents could know on April 13 whether they got the real vaccine last spring. For those at a distance, it might be a day or two later before the information is available through official channels.

Of all vaccines, including probably the Salk polio vaccine now being evaluated at the University of Michigan, the yellow fever vaccine comes closest to being 100% efficient.

Yellow fever, like polio, is caused by a virus. But the yellow fever vaccine, unlike the Salk polio vaccine, is made from live virus. The Salk polio vaccine is made from killed virus.

The yellow fever vaccine must be freshly prepared and the persons giving it must be licensed to do so. The person successfully vaccinated actually gets a very modified form of the disease. With this, as with smallpox vaccine, doctors can tell whether there was a "take" by the person's reaction, such as fever in the case of the yellow fever vaccine.

Smallpox is also a virus disease, like polio. But to vaccinate against it, the virus of the related cowpox is used. When there is a "take," indicating a successful vaccination, the person has gotten a very modified form of cowpox. Some scientists have hoped a similar kind of vaccine might be developed against polio.

100% Not Expected

Many people are confident the Salk vaccine will be shown to be effective. But probably no scientist, including Dr. Salk, expects 100% efficiency.

Some people cannot be successfully vaccinated. Their bodies are not capable of producing antibodies to disease germs, even when stimulated to do so by vaccines. If some of the Salk-vaccinated children came down with paralytic polio, it may have been for this reason, rather than because of any failure of the vaccine. This is one of the problems that Dr. Francis and his group presumably will consider in evaluating their study.

Efficient vaccines against typhoid fever, Rocky Mountain spotted fever and typhus fever have been made and are in use. These are made from killed germs of the diseases.

One of the earliest disease-preventing immunizations given children is that for diphtheria. The vaccine for this is made by detoxifying the toxin, or poison, produced by the diphtheria germs. The Schick test, familiar to many school children, tells whether or not "shots" to protect against diphtheria have been effective.

Fight Not Over

Even if the Salk polio vaccine proves highly efficient, eradication of polio may take a long time.

Some authorities think if the present vaccine is effective, polio will be a disease of the past in a year or so. Others say that to eradicate polio that quickly, it would be necessary to vaccinate at least 70% of the population all at once, or 90% of the population under 25 years old.

"Shots" to protect children against diphtheria are fairly routine now. But it has taken a quarter of a century for scientists to develop the immunizing toxoid to its present level and to get a large percentage of babies and small children given the "shots." Even so, 200 to 300 cases of diphtheria still occur every year in the United States.

AGRICULTURE

1954 Corn Borer Loss Heavy; Outlook Is Bad

➤ THE NATION'S corn farmers are expected to lose more than seven percent of their grain this year to the European corn borer.

Predicting heavier attacks of the pest during the coming year than were experienced in 1954, the U. S. Department of Agriculture revealed that losses last year almost reached the seven percent mark.

The total United States loss to the pest last year was 192,000,000 bushels, valued at more than $261,000,000.

Ironically, the European corn borer destroyed in the United States last year an equivalent of almost one-third of all the corn raised in Europe that year.

Iowa was heaviest hit of the 25 eastern and Midwestern states surveyed. The Hawkeye state lost almost one-fifth of its 581,000,000 bushel crop. The corn borer's appetite accounted for the destruction of 94,000,000 bushels in Iowa.

Illinois lost more than 38,000,000 bushels, Nebraska, 22,000,000 and South Dakota, 17,000,000.

Earlier, Agriculture entomologists warned American farmers that they face serious threats again this year from the borer. Biggest problem areas are likely to be in the same four states that suffered the biggest losses in 1954.

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MEDICINE

Probability of Broken Bone One Per Person

➤ THE PROBABILITY of having a broken bone is at least one per person in the United States, Dr. Harold E. Crowe of the Los Angeles Orthopaedic and Methodist Hospitals has figured.

He attributed the 162,000,000 or so probable broken bones to the modern machine age, violent sports, high speed travel and increased life expectancy.

The type of broken bone that can best be treated in the doctor's office, he said, is the very common fracture of the upper arm bone just below the shoulder. Older people very often break this bone, he said.

Children often break finger bones while playing. If a person escapes this, it is very likely that in later years he will become less skillful in movement, will trip and fall, and without thinking throw out his hand to break the fall.

This results in the common fracture just above the wrist. Such breaks can be treated in the doctor's office but will almost invariably result in visible deformity. Even so, full use of the wrist can be obtained.

"Many cowpunchers are thrown from their horses, suffer fractures of this type, and never seek medical care," Dr. Crowe said. "Many make a complete recovery as far as use of the wrist is concerned."

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NUTRITION

No Free World Famine

UN agency tabulation indicates that there will be enough food in 1955 for countries outside of the Iron Curtain. There are shortages, but also ample surpluses.

➤ FAMINE WILL not plague the free world this year.

Areas of the free world are now facing serious food shortages, but ample surpluses in neighboring countries will hold the famine horseman from galloping across the line between hunger and wholesale starvation.

Tunisia, Laos, Cambodia and Liberia have suffered heavy grain losses. They might not have enough domestic supplies to feed their populations. But despite empty national larders, there is little evidence that the shortages will reach emergency proportions requiring international action.

Of the 71 member nations of the United Nations' Food and Agriculture Organization, only Liberia in Africa has reported a food shortage.

Reports from Communist North Viet Nam indicate that the people in that area are threatened with starvation and unless Red China comes to their aid, more than 1,000,000 face death.

There have been no similar reports from either Russia, Communist China or the satellite nations that famine conditions are threatening. It should be pointed out, however, that the Communists consider food production as strategic information and particularly when it is adverse, suppress its publicity.

The Communist nations are not members of the FAO, which is the UN's clearing house for the world's food problems, and there is no official information available.

Threatened shortages in the free world nations, on the other hand, are reported to the FAO.

This is the present state of the free world's food shortage situation as compiled by FAO headquarters in Rome for SCIENCE SERVICE:

Drought has seriously affected the grain crops in Tunisia, but it is still too early to tell how great the total loss will be. Improved weather might alleviate the situation in part, as harvesting does not begin for several more weeks.

Tunisia has put an embargo on soft wheat exports. Even then, if domestic crops are not enough to feed the population, there should be no difficulty in obtaining food from neighboring countries in North Africa, or from France, which has very ample supplies.

Cambodia has had a bad rice crop, estimated at only one-half the normal production. There is talk, however, of importing 200,000 to 300,000 tons of rice.

Laos is reported to have had the worst rice crop on record. South Viet Nam, which is a neighbor to both Laos and Cambodia, on the other hand, has a substantial export surplus.

Liberia, which has reported a shortage officially, asked for 1,000 tons of rice which is interpreted by observers as an indication that the extent of the threat is very small.

Thailand has some areas where food is short, but the nation as a whole has large reserves of rice.

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PSYCHOLOGY

Commentators May Read Worse Than Engineers

➤ WRITERS AND commentators who deal with words much of their life sometimes are worse readers than engineers or accountants. This is shown by tests at the Yoder Reading Improvement Center in New York.

One stockbroker was found to read almost twice as fast as another stockbroker of the same age and of similar educational background. Two playwrights, same age and background, were tested. One read 200 words a minute; the other 600 words a minute. Three hundred fifty words a minute is average, according to accepted reading standards. One radio commentator read extremely slowly, even to himself. He could not learn to see more than one or two words at a time. Another commentator, without much special training in reading skill, can glance at a page, look up and repeat it almost word for word.

Personality helps to determine your reading ability, says Mrs. Hilda W. Yoder, director of the Center.

"It is hard to make certain personalities turn loose of each word and learn to look for only important words in their reading," Mrs. Yoder says. This is the slow, sure person, one who inspects every detail. True enough, it is this type person who generally seeks out work dealing with such precise professions as engineering or law.

A good reader, no matter what his occupation, has developed his imagination and sense of judgment to the point where he can quickly comprehend what the author is trying to say. He adjusts his reading speed to the material. He slows his gait to read contracts, great books or technical papers where every word counts. He speeds his pace to pick out only the key words and ideas when he reads business correspondence, reports, newspapers—material that comprises about 90% of an average person's reading.

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CHEMISTRY

Cancer Chemicals Related

Reaction that operates differently in body and test tube may initiate chemically caused cancers. Electrons may be transferred to body enzyme system.

➤ BETTER UNDERSTANDING of the way cancer-causing chemicals may disrupt the energy balance in living tissues is forecast by a study of chemical likeness among different carcinogenic agents.

A common mode of action among a number of different substances all causing irritations which lead to cancer was reported by Dr. True W. Robinson of the University of Alabama Medical Center, Birmingham, Ala.

An oxidation-reduction mechanism which operates differently in the living body than in test tube experiments is believed by Dr. Robinson to transfer electrons to the body's enzyme system, thus furnishing energy for starting cancer growth in certain cells. Dr. Robinson explained this new theory of the start of chemically caused cancers to the American Chemical Society's division of biological chemistry in Cincinnati.

Studies on how tumor cells compete with their hosts for the nucleic acids on which they feed were reported by Dr. L. L. Bennett Jr., of the Kettering-Myer Laboratory of the Southern Research Institute, also of Birmingham, Ala.

Two cases in which human tumors were transplanted into animals, one into a hamster, the other into a rat, showed that normal tissues made better use of the nucleic acids than did the tumors. This suggested to Dr. Bennett that some product of the tumor cells may interfere with the nourishment of the host cells, either by production and subsequent breakdown of complex chemicals or by causing a lack of the necessary enzymes to carry on normal feeding of the tissues.

Certain complex chemicals, capable of two forms in which the atomic arrangement is twisted either to the right or to the left, differ in the way they can be utilized for growth by the tissues of the body. By building cancer-causing chemicals with such differences in chemical structure, studies aimed at throwing further light on the development of cancerous growths were reported by Dr. Sanford M. Birnbaum of the National Institutes of Health, Bethesda, Md.

Left-handed arrangements proved chemically more active in these experiments than the right-hand types of compounds. Tissues of the liver and the kidneys were more active in breaking down these compounds than were cells from the intestine, pancreas, lung or spleen. Dr. Birnbaum and his associates hope to learn whether changes in chemical structure can be used to help combat cancer.

Radioactive yttrium is the latest atomic reactor fission product to be used in fighting cancer. It is incorporated into a plastic which is extruded through a heated die to make a flexible thread, getting radioactivity where it will do the most good.

The plastic into which the yttrium in the form of its oxide is incorporated slowly dissolves in the tissues where this thread-like filament is placed, leaving the source of the radioactivity in the tissues to be treated.

This method of utilizing the high beta-activity of yttrium for cancer treatment was reported by Dr. H. C. Dudley of the Radioisotope Laboratory of the U. S. Naval Hospital, St. Albans, N. Y. It is an improvement upon the use of fused filaments of germanium oxide tried out earlier at the same laboratory as a means of implanting radioactive materials in tissues.

Yttrium is particularly easy to place in certain tissues by experimental means, because it is not carried from place to place by body processes. Taking advantage of the fact that small doses of radioactive yttrium locate in the outer parts of bone but not in the marrow, Dr. Dudley also reported on possible use of this fission product for bone cancer treatment. Larger doses of yttrium locate similarly in definite organs, such as the stomach, spleen and liver.

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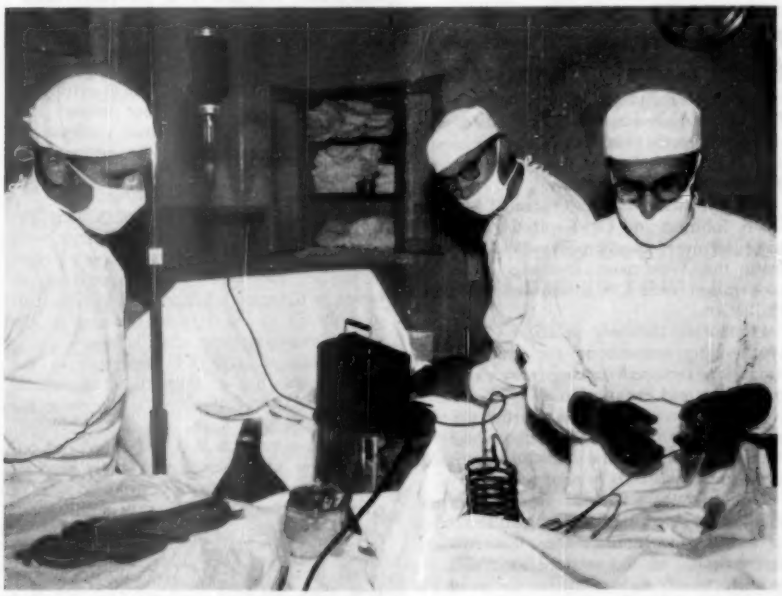

WARM TRANSFUSION—Scientists prepare to use blood-warming equipment in an operation in which new blood will be substituted for a baby's blood that is contaminated with Rh antibodies. Left to right are, Dr. Volney C. Wilson, inventor of the equipment, and Drs. Frank L. Marting and Stewart C. Wagoner, Schenectady pediatricians.

• RADIO

Saturday, April 16, 1955, 5:00-5:15 p.m. EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.

Dr. Dorland Davis, chief of the Laboratory of Infectious Diseases, Microbiological Institute, National Institutes of Health, Bethesda, Md., will discuss "Common Respiratory Illnesses."

MEDICINE

Perfect Warmer for Rh Baby Blood Transfusions

➤ A DEVICE to keep the blood warm while it is being transfused to Rh babies has been perfected by Dr. Volney C. Wilson, physicist at General Electric Research Laboratory in Schenectady, N. Y.

Because Dr. Wilson's youngest son, now six, was an Rh-negative baby saved from death by an exchange transfusion of healthy blood, he was particularly interested in the problem presented by his pediatrician neighbor, Dr. Stewart C. Wagoner.

The problem was that of preventing shock and death from the cooler blood being transfused to save the baby. Dr. Wagoner thinks that this cool blood shock may be the cause of 10% of deaths of new babies in exchange blood transfusions.

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BIOLOGY

Smithsonian Acquires Giant, Three-Foot Worm

➤ A GIANT "worm," more than three feet long and with a name to match, balanoglossus, has been acquired by the Smithsonian Institution.

Dug out of its home beneath the sandy beach of Grand Isle, La., the specimen is described as one of the largest of its kind ever extracted intact. An extremely fragile body that shatters when the animal is disturbed has frustrated many past attempts at collecting a complete worm.

Known popularly as the acorn worm, the balanoglossus is found throughout the seacoasts of the world. It derives its name from the fact that it remains buried in the mud or sand, showing only a food-gathering proboscis in the water. The proboscis is acorn-shaped, and thus balanoglossus, which is a common name for many species of mudworms, comes from the Greek balanos meaning acorn and glossa meaning tongue.

Just where the balanoglossus fits into the animal world is debatable. Some think that it is a link between worms, members of the starfish family and the vertebrates. Its fragility has made it difficult for biologists to study the balanoglossus critically. It is now hoped that the preserved Smithsonian specimen will add to the scientists's knowledge of the big creature.

The balanoglossus strongly smells of iodine and the flavor of iodine which is sometimes encountered in shrimps and lobsters is often because these little sea animals have been feeding on the balanoglossus.

As the Smithsonian biologists point out, the balanoglossus got stuck in the mud 200,000,000 to 300,000,000 years ago and although it might possibly be a "poor relation of the higher animals," it remains a "super-worm that never realized its potentialities of becoming something more than a worm."

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STATISTICS

Chicago's Population To Grow by 774,000

➤ CHICAGO, AMERICA'S second largest city, may expect to add over three quarters of a million to its population in the next ten years.

An estimate made by Dr. Donald J. Bogue, associate director of the Scripps Foundation for Research in Population Problems at Oxford, Ohio, indicates that the population of Chicago's metropolitan area will reach 6,762,000 by April 1, 1965, a gain of 774,000 in the next decade. This estimate is based on the assumption that America remains at peace and that Chicago has neither boom nor disaster.

The city of Chicago itself, which already has an "old" population, may expect to have a gain of 111,000 persons over the age of 65 by 1965. This aging effect will be offset, however, by the results of the recent baby boom which will add some 115,000 children under the age of 14 to the population. The increase of both children and persons of or beyond retirement age will put an increasing squeeze upon those of working age. By the year 1965 there will be a shortage of persons from 25 to 35 years old, a result of the lowered birth rates during the depression years.

By the year 1965, babies born since 1944 will be reaching an age where they will want to marry and start homes of their own. This will cause an increase in the demand for additional housing units.

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MEDICINE

Kidney Stones Due to Overactivity of Glands

➤ IN ABOUT one out of 20 cases of kidney stones the trouble is due to overactivity of some little glands located next to the thyroid gland in the neck. The glands are called parathyroid glands and the hormone they produce controls distribution of calcium and phosphorus in the body.

Their role in causing kidney stones was reported by Dr. R. G. Sprague of the Mayo Clinic, Rochester, Minn., at the meeting of the American Academy of General Practice in Los Angeles. When these glands are overactive, more calcium and phosphorus get into the urine and this condition favors the formation of kidney stones, Dr. Sprague explained.

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CHEMISTRY

Male Hormone Made From Simple Chemicals

➤ THE MALE sex hormone has been synthesized directly from simple coal tar chemicals for the first time, the University of Wisconsin has announced.

The synthesis was accomplished by Prof. W. S. Johnson and Dr. Raphael Pappo, visiting lecturer in chemistry at Wisconsin from the Weizmann Institute, Israel, in cooperation with Drs. Brian Bannister and E. J. Pike.

Heretofore the only practical method of synthesizing testosterone, the male sex hormone, has required starting from a complex natural steroid chemical such as cholesterol.

The present synthesis starts from the simple coal tar product, 1,6-dimethoxynaphthalene. The method, the scientists emphasize, is not practical in its present form.

Unlike the commercial process, the new method produces both dextro and levo types of testosterone. This means that two different kinds of testosterone molecules are manufactured, each a mirror-image of the other.

The dextro testosterone is the natural hormone manufactured by the male glands. What physiological properties the levo type will have is not yet known.

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IN SCIEN

MEDICINE

Brain Stimulants Keep Tired Fliers Efficient

➤ ONLY BRAIN stimulants such as caffeine and Dexedrine ("pep pill" ingredient), of various proposed measures, are able to keep tired aircrews working efficiently, tests at the U. S. Air Force School of Aviation Medicine, Randolph Air Force Base, Texas, show.

The tests were reported by Maj. Robert B. Payne, USAF (MSC), and Dr. George T. Hauty at the Aero Medical Association meeting in Washington.

Other measures the scientists had thought might counteract the effects of fatigue were techniques for giving the men extra motives to go on working efficiently and different designs or routines for the tasks to be performed.

A person's susceptibility to fatigue that would cut down his skill and efficiency can be predicted, the scientists found, but this part of the work is not ready, they said, for reporting.

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MEDICINE

Short Red Cell Life Cause in Some Anemias

➤ A SHARP decline in the life span of individual red cells produces "secondary" anemia usually found in people with cancer, arthritis and certain other diseases, it is suggested by Dr. Joseph Ross, professor of medicine and of radiology and associate dean of the Medical School of the University of California at Los Angeles.

Using radioactive tracer techniques, Dr. Ross studied the red cells of patients with rheumatoid arthritis and with several types of cancer. He found that red cells of patients with active disease had a life span of only 30 to 70 days in contrast to the normal survival time of 120 days.

The rate of red cell formation in the patients was higher than those of normal people but not enough to compensate for the decreased life span.

Dr. Ross suspects that the entire red cell population in patients with these diseases ages more rapidly than normal because of changes in body chemistry brought about by the diseases.

"Secondary" anemia should never be taken lightly, the U.C.L.A. doctor warns. It is often the only objective evidence of a serious disease that may be in a remedial stage and if the cause of the anemia is looked for and discovered, the underlying disease may be cured before it is too late, he adds.

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CE FIELDS

VIROLOGY

Million Viruses Needed For Single Infection

➤ AS MANY as a million viruses are needed to establish a single infection, research with tobacco mosaic viruses at the University of California at Los Angeles indicates.

This has been found by Drs. Albert Siegel, Irving Rappaport and Samuel Wildman in research supported by the Atomic Energy Commission.

Such a large number of viruses is apparently required because only a few of the virus particles have the power to reproduce themselves. The remaining particles seem to be inactive and play no role in reproduction. Chances are also small that an infective particle will find a susceptible site for attachment, a prerequisite for infection.

Evidently a single cell cannot be infected simultaneously with two active viruses. The infection seems to spread from cell to cell through protoplasmic strands connecting them. The reproducing units that cross over the protoplasmic bridge are probably different from the fully formed, mature viruses. If fully formed viruses are extracted from the tobacco leaf, they are incapable of starting another infection.

The process of virus reproduction ends with the death of the cell, approximately 20 hours after the virus attaches to its protoplasm. By this time, 500,000 virus rods are manufactured by the cell as a result of a code supplied by the infectious virus.

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METALLURGY

Titanium Chloride Gas By Continuous Process

➤ A CONTINUOUS fluidized process for making low-boiling titanium tetrachloride from difficult ores marks another step away from the batch process methods by which titanium, the lightweight wonder metal, was first won for industry.

A liquid at ordinary temperatures, titanium tetrachloride changes to smoky fumes of titanium oxide when air touches it. This oxide is the white pigment used in paint and porcelain. It is also used as the source of titanium metal. But extraction from the ore is most easily done with aid of chlorine, poison gas of World War I.

By bubbling chlorine gas through dry, powdered titanium-bearing ore in the new process, in a furnace heated to about 1500 degrees Fahrenheit, titanium chloride is formed as a gas and piped to a condenser, where it is liquefied. Iron contained in the ore combines with the chlorine at the same time. It is removed as a salt-like solid. The new method is described in patents Nos. 2,701,179 and 2,701,180, recently issued to Du Pont Co., Wilmington, Del.

Ash from the exhausted ore, which would clog the bed of powdered mineral, is removed at intervals. But slag from some Canadian iron furnaces, suggested as a source of the new metal because it contains large amounts of titanium not recovered by iron-making methods, would add troublesome alkali to the ash.

Alkali in the ash would furnish low-boiling compounds of unwanted metals to contaminate the titanium won by the new process. Adaptation of the continuous process by drawing off part of the powdered mineral, washing out the alkaline compounds, drying the undissolved part and returning it to the furnace to take part in the chlorine treatment, as part of the continuous cycle, is provided for in one of the patents on the new process.

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AERONAUTICS

Jets Remote Controlled By UHF Radio Signals

➤ REMOTE CONTROLLED jet planes, such as those being used in the current Nevada nuclear test series, are now guided by an improved ultra-high frequency radio system for continuous control, including emergency procedure if directing signals cease.

The system was developed by the Air Force's Air Research and Development Command at Baltimore, Md., and the Sperry Gyroscope Co., Great Neck, N. Y.

If radio control signals shut off while the drone is in flight, a miniature electronic "brain" takes over within five seconds, directing the plane to a pre-set altitude where it circles until signals are restored.

The new system, designed as a standard production version, can be applied to piston as well as jet aircraft. It operates both ground-to-air and air-to-ground.

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MEDICINE

More Polio Deaths After First Case in Family

➤ GREATEST DANGER of poliomyelitis death is to persons 15 years and older in families where there has already been one case of the disease.

The reasons are that there are more cases of bulbar polio, affecting vital brain centers, when there are several cases in a family in persons over age 14 and bulbar polio kills a higher percentage of polio victims.

These findings, from a study of 5,563 polio cases in New York City from 1949 through 1953 inclusive, are reported in the *Journal of the American Medical Association* (March 26) by Dr. Morris Siegel of State University of New York College of Medicine, Brooklyn, and Dr. Morris Greenberg of the New York City Department of Health.

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MEDICINE

Technique Diagnoses Cancer of the Womb

➤ CANCER OF the womb can be diagnosed by a promising new technique developed at the University of California Medical Center in Los Angeles.

Studies by doctors in the department of obstetrics and gynecology have shown that a small quantity of salt solution injected into the uterine cavity will wash down bits of tissue from the womb. The tissue can then be chemically treated and examined under the microscope to determine if it is cancerous or not.

More than 100 patients complaining of abnormal uterine bleeding were examined by both the new technique and ordinary vaginal smears. It was found that the new technique was far superior to vaginal smears in obtaining samples of uterine tissue.

A number of cases were diagnosed as cancer of the womb. These were confirmed by biopsy.

The results are promising for detecting cancer in an area not accessible for ready examination, the investigators say.

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ELECTRONICS

Robot Radar Warning Stations Seen Possible

➤ A NETWORK of robot radar antennas monitored at a central station for evidence of enemy attack could be set up using a new system.

The development, reported at a meeting of the Institute of Radio Engineers in New York, is a method to squash the radar screen signal so it could be transmitted on ordinary telephone lines. At present coaxial cables or expensive microwave relay systems are needed to carry radarscope pictures.

Taking advantage of the inherent repetition of radar signals from rotating antennas, the system can code the picture to fit in the limited band width of a telephone circuit.

The original radarscope image would be automatically scanned at 1/100 the speed of the projecting beam which would produce no significant loss of information.

Suspicious "blip" pictures, radar experts point out, could be transmitted for analysis from the central station to higher authorities anywhere in the world where there are telephone lines.

The device might also find use in transmitting continuous traffic information from one civilian airport to another, or to a central traffic control bureau.

C. W. Doerr and J. L. McLucas, of Haller, Raymond and Brown, Inc., State College, Pa., said reductions in band width in the order of 100 or 1,000 to one would be possible with the system. This means that the signal would take up 1/100 or 1/1,000 as much space in communication wires as conventional radar communicating systems.

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MEDICINE

Death By Sting Shock

Bees, wasps and hornets can kill by shock. Death at the wheel might be sting death, not heart death. Chemical credited with life-saving role.

See Front Cover

By JANE STAFFORD

➤ BEES, HORNETS, wasps and spiders threaten death, or at least serious sickness, to many. Folk tales generations ago and newspaper accounts in modern times tell of persons who were stung to death through carelessness in handling a nest of wasps or hornets or trying to rob a bee tree. Some of the accounts were about farmers stung to death when the blade of a mowing machine or horse's hoof disturbed a nest of bumble bees.

Farm fields, country homes and gardens are not the only places where this insect sting danger threatens. The driver of an automobile or truck on a highway who crashes his vehicle into another or into a tree may not have been asleep at the wheel or the victim of a sudden heart attack. The shock reaction from a bee or wasp sting may have caused his collapse and death. The number of such cases that have been incorrectly labeled heart or traffic deaths is impossible to estimate.

This new picture of the sting death threat was presented by Dr. D. G. Miller Jr., of Morgantown, Ky., professorial lecturer in medicine at the University of Louisville, Louisville, Ky., and associate professor of preventive medicine at Meharry Medical College, Nashville, Tenn., at the first International Conference on Animal Venoms.

"Killers" Shown

Although merely annoying to some, the creatures shown on the front cover of this week's SCIENCE NEWS LETTER can kill. A scorpion, at the left, crowds a black widow spider. Below and center, a centipede shows its "black crescent of death face" next to a honey bee. At top is a malaria mosquito.

Each year, Dr. Miller said, he and his colleagues have been seeing three to eight patients with severe reactions to stings by insects. Often the patient reported he had only been stung once, though if the sting had been about the head, the swelling would make the patient unrecognizable even to relatives. As an example of severe sting reaction, Dr. Miller related the following incident in his report at the conference:

"Dr. J. Murray Kinsman, dean of the University of Louisville School of Medicine, was stung during the late summer and suffered such a severe and immediate reaction that a colleague who accidentally dropped by the home at the time of the incident found Dr. Kinsman pulseless and without measurable blood pressure in only minutes. Prompt treatment resulted in a complete recovery."

Even more dramatic was the case Dr. Miller reported of a three-year-old boy brought into his office "dying." The child had been playing in some high weeds. He ran to his mother and cried out that a wasp had stung him on his head and then fell to the floor. He immediately turned blue and no heart beat or pulse could be felt and he seemed to have stopped breathing.

Was Thought Dead

The mother feared he was beyond medical assistance, but picked him up and walked across the farm until she located her husband. They located a car to bring the little boy to town, 15 miles away. During the trip they decided the boy was dead and debated whether to take him to the undertaker or to the doctor.

When they reached the doctor's office, the boy was blue and in collapse.

Up to this time, Dr. Miller, like other physicians, had considered the severe reactions to stings as an allergy and had been treating the patients with the usual medicines to constrict blood vessels (familiar to many in nose drops for head colds), cold compresses and anti-histamines as they became available.

This treatment plus a stimulant drug was given to the little boy who was apparently dying from the wasp sting. But the child responded so slightly it was feared he would not live to reach the nearest hospital, 25 miles away, even with oxygen and artificial respiration.

Tries Calcium

At this point Dr. Miller decided to try something new. He remembered that calcium, the tooth, bone and milk chemical, had neutralized the action of the black widow spider's poison "with almost magical, although rather short-lasting relief of the severe muscle cramping."

So he gave the little boy another shot into the veins of the antihistamine, Benadryl, and then, without taking the needle out of the vein, a dose of a calcium lactate solution.

The child got better so fast that he moved his previously limp and paralyzed arm and dislodged the hypodermic needle before the doctor had noticed any change except better color and breathing. The improvement did not last and another dose of calcium lactate had to be given. While the last of this was running into his veins, the child recognized his father, asked for water and ice cream, and said nothing hurt him but a wasp sting on his head.

When Dr. Miller saw the child the next day and the day after, he was apparently normal in every respect.

This experience has led Dr. Miller to recommend that physicians keep calcium lactate in their bags and offices, ready for emergency use in treatment of these shock reactions to stings.

Dr. Miller thinks these severe sting reactions, and similar severe reactions to bites of biting insects, are what scientists call anaphylactic shocks. The person suffering such a shock is reacting in an exaggerated way to a foreign protein substance. He is supersensitive to the venom or toxin or to the body proteins of the insect.

This is something like being allergic to a pollen or food protein, but it is not quite the same. In the case of the anaphylactic shock reaction to insect toxins or venoms, the patient presumably has been bitten or stung once before the bite or sting that brought on the shock reaction. The first one, probably not particularly noticed or remembered, may have sensitized the patient so that the next bite or sting caused the exaggerated reaction.

Suggests Desensitizing

On this theory, such patients might be helped by desensitizing them, using for this purpose extracts of the crushed whole bodies of insects, Dr. Miller suggests. After a series of such injections the patient will not suffer such severe reactions to bites and stings. He also, Dr. Miller says, "is not nearly so attractive to the biting and sucking insects and apparently is less enraging to those that sting."

Following this theory, the person who has had a badly swollen hand or foot or has wheezed and turned blue around the lips after a bite or sting would do well to consult his doctor about the desensitization procedure.

The rest of us who just get a painful sting can go right on pressing out the sting, if possible, and applying household ammonia or baking soda for relief of the discomfort.

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A dose of about 25 roentgens of *radioactivity* received by a person over a brief period of time will produce temporary changes in the blood.

The submarine Nautilus' power plant is the nation's second full-size power-producing *atomic engine;* the first was a land based prototype which first produced substantial power in Idaho in 1953.

PHARMACOLOGY

Brain Wash Drug Effects

➤ SUCCESS OR failure of brain washing by means of drugs will depend on the personality of the individual as well as on the drug used. It might take a different drug to brain wash a well balanced person than one with shaky personality.

Failure to recognize that a drug acts differently on different persons, according to differences in personality make-up, may be why some American physicians and psychiatrists have been inclined to discount reports that the Communists used this or that drug in their brain washing activities on prisoners.

The importance of these differences in drug response, in connection with narcotic drug addiction and control, treatment of mental and other diseases, and in bearing on the brain washing problem, is stressed by Drs. John M. von Felsinger, Louis Lasagna and Henry K. Beecher of Harvard Medical School and Massachusetts General Hospital, Boston, in the *Journal of the American Medical Association* (March 26).

The "impressive reputation" of opium drugs as dangerous because of the feeling of well-being they may induce seems largely based on the writings and experiences of celebrated literary figures such as De Quincey, Coleridge, Baudelaire and Cocteau, the Boston doctors state.

Many agents, such as antihistamines, and large doses of aspirin and coffee, are reported as producing this feeling of well-being in addicts, they point out.

In normal persons, they find, the opium drugs such as morphine and heroin produce unpleasant feelings, rather than the happy feeling they are generally supposed to bring on.

Among their 20 volunteers in the study, the seven who got happy feelings from heroin or morphine or both were immature, impulsive and self-centered. They had unrealistic goals and ambitions and were the most hostile and anxious of the whole group.

In these persons an unpleasant reaction soon followed a pleasant one induced by a drug. This, the scientists report, is because the false feeling produced by the drug is a threat to the personality's shaky balance and results in "fear or panic."

Amphetamine, popularly known as an ingredient of "pep pills," has been reported one of the drugs used in brain washing by the Communists. The poorly adjusted person would, according to the Boston studies, react with a good feeling at first, followed by the shaky, panicky feeling. A well adjusted person, on the other hand, might find this drug stimulating, but might be upset by the sleeping pill barbiturates because such a person finds them "confusing." The poorly adjusted person finds them pleasant because they bring an intermission from tension.

The Boston doctors think the effects of drugs that act on the brain and central nervous system should be considered in connection with the state of those parts of the body, as reflected in the personality, just as the effects of a heart drug are considered in relation to the state of the heart, or of a kidney drug in relation to the state of the kidneys.

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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ADSORPTION STUDIES OF HETEROGENEOUS PHASE TRANSITIONS—S. J. Birstein—*Office of Technical Services*, Geophysical Research Papers No. 32, PB 111602, 37 p., illus., paper, $1.25. A study having to do with cloud seeding.

THE ADULT-CHILD INTERACTION TEST: A Projective Test for Use in Research—Theron Alexander—*Child Development Publications (Peninsular Publishing Co.)*, Monograph of the Society for Research in Child Development, Volume XVII, Serial No. 55, No. 2, 40 p., 8 separate plates on cards, paper, $4.50. This test has been used on "children" from six to 65 years.

AUTOMOBILE WORKERS AND THE AMERICAN DREAM—Ely Chinoy—*Doubleday*, 139 p., $3.00. Information for this book was obtained by the writer in interviews and conversations with auto workers as he worked beside them. The average worker exchanges his "dream" for one goal after another within easier reach—a car, a little house, a TV set, education for his children.

"BEFORE I KILL MORE . . ."—Lucy Freeman—*Crown*, 316 p., illus., $3.50. A newspaper science writer digs into the intimate history of William Heirens in an attempt to disclose why this boy was driven by a compulsion to burglary and murder.

BEHAVIOR AND MISBEHAVIOR—James L. Hymes Jr.—*Prentice-Hall*, 140 p., $3.00. To help the teacher deal with problems of discipline and giving her hints on how to bring out the best, not the worst, in her charges.

BIOCHEMISTRY OF THE AMINOSUGARS—P. W. Kent and M. W. Whitehouse—*Academic*, 311 p., illus., $6.80. To better acquaint readers from other sciences with current knowledge in this field.

BIOLOGY AND WORLD HEALTH—Madeleine P. Grant—*Abelard-Schuman*, 202 p., illus., $3.50. A book for young people showing the link between biology and individual and world health.

A CHILD DEVELOPMENT POINT OF VIEW—James L. Hymes Jr.—*Prentice-Hall*, 145 p., $3.00. To help the teacher build health in the children in her care.

A COMPANY GUIDE TO THE SELECTION OF SALESMEN — Milton M. Mandell — *American Management Association*, Research Report Number 24, 161 p., illus., $4.75. Companies estimate that hiring the wrong man for salesman costs the firm $6,684.

COMPANY PRACTICES IN EMPLOYEE TRANSFERS AND RELOCATION — Judith Calver — *American Management Association*, 28 p., paper, $1.50. A large number of companies now help employees defray the cost of relocation.

DELINQUENCY IN OUR DEMOCRACY: A Study of Teen-age Behavior Among Negroes, Mexicans, Puerto Ricans, Japanese, Chinese, Filipino and American Indians in Los Angeles, San Antonio, Gary, Ind., Cleveland, Memphis, New York, Chester, Pa.—Richard E. Harris, *Harris*, 160 p., $3.50. The author sees racial and national tensions as linked to the causes of youthful misdoing.

DESCRIPTIVE COLLEGE PHYSICS—Harvey E. White—*Van Nostrand*, 485 p., illus., $5.75. Text for a one-semester descriptive type of physics course.

DESIGNING FOR PEOPLE—Henry Dreyfuss—*Simon and Schuster*, 240 p., illus., $5.00. Telling how many familiar objects—telephone, faucets, alarm clocks, streamlined trains and airplanes—were designed to give comfort and pleasure to the people who use them.

AN EARLY ARCHAEOLOGICAL SITE NEAR PANUCO, VERA CRUZ—Richard S. MacNeish with a foreword by Alfred V. Kidder—*American Philosophical Society*, Transactions New Series—Volume 44, Part 5, 1954, 102 p., illus., paper, $2.00. Excavations reported here yielded material to show that a cultural area from Peten to Panuco was occupied by Maya-speaking peoples who were later split by invaders.

ELECTRONICS FOR YOUNG PEOPLE—Jeanne Bendick—*McGraw-Hill*, rev. ed., 187 p., illus., $2.75. This edition is enlarged to include more material on atomic energy.

FIRST MEN: The Story of Human Beginnings—Irving Goldman and Hannah Goldman—*Abelard-Schuman*, 180 p., illus., $3.00. Telling, for young people, the story of man's history from its earliest beginnings to the days of the American Indian.

GENERAL CHEMISTRY—L. E. Steiner and J. A. Campbell—*Macmillan*, 673 p., illus., $6.50. A beginning college text.

HOUSEHOLD EQUIPMENT—Louise Jenison Peet and Lenore Sater Thye—*Wiley*, 4th ed., 444 p., illus., $6.00. To give home economics students and teachers as well as homemakers a better understanding of the tools of the household.

ION EXCHANGE AND ADSORPTION AGENTS IN MEDICINE: The Concept of Intestinal Bionomics—Gustav J. Martin—*Little, Brown*, 333 p., illus., $7.50. Presenting the idea of the author that anion and cation exchangers can be used to prevent certain gross pathology.

IONIZING RADIATION AND THE CELL—Leslie F. Nims, Conference Chairman—*New York Academy of Sciences*, Annals, Volume 59, Art. 4, 200 p., illus., paper, $4.00. Reporting progress made in interpreting radiation results.

THE LATITUDINAL AND SEASONAL VARIATIONS OF THE ABSORPTION OF SOLAR RADIATION BY OZONE—Jerome Pressman—*Office of Technical Services*, Geophysical Research Papers No. 33, PB 111603, 34 p., illus., paper, $1.25. The results indicate that length of day and solar altitude are sufficient to explain ozone solar absorption.

NOMOGRAPHY AND EMPIRICAL EQUATIONS—Dale S. Davis—*Reinhold*, 236 p., illus., $6.75. Showing how to employ these tools to speed up the engineer's daily on-the-job calculations.

NORTH AMERICAN MOOSE—Randolph L. Peterson—*University of Toronto Press*, 280 p., illus., $12.50. By a specialist on wildlife conservation.

PRINCIPLES OF EMULSION TECHNOLOGY—Paul Becher—*Reinhold*, 149 p., illus., $2.95. Information, theoretical and applied, on emulsions for those who have already had a course in physical chemistry.

RADIOBIOLOGY SYMPOSIUM 1954—Z. M. Bacq and Peter Alexander—*Academic*, 362 p., illus., $9.80. Papers presented at the symposium with discussion of them.

THE RELATION OF IMMUNOLOGY TO TISSUE HOMOTRANSPLANTATION — John Marquis Converse and Blair O. Rogers, Conference Co-Chairmen—*New York Academy of Sciences*, Annals, Volume 59, Art. 3, 190 p., illus., paper, $4.00. Discussing the difficulties in getting bone and tissue transplants to grow in their new location.

SCIENCE AND ITS BACKGROUND—H. D. Anthony—*Macmillan (St. Martin's Press)*, 2d ed., 337 p., illus., $4.00. Telling the story of science in its background of history.

STABILIZATION OF SOILS—R. L. Handy and others—*Highway Research Board*, Bulletin 98, 52 p., illus., paper, 75 cents.

WHO'S WHO IN WORLD AVIATION: Volume One 1955—Wayne W. Parrish, Ed.—*American Aviation*, 345 p., $10.00. A badly-needed roll of some 2,400 persons in this fast growing field.

Science News Letter, April 9, 1955

CHEMISTRY

Rays Spoil Fermentation

Sterilization of preparations by cobalt-60 radiation can affect fermentation unless the rays are properly used. Only separate nutrients should be irradiated.

➤ COBALT-60 RADIATION can spoil fermentation processes, such as are used in the manufacture of food, drink or antibiotic preparations, unless the radiation is properly used. Only the separate nutrients should be irradiated. These may then be mixed to make up the solution that feeds the micro-organisms.

Comparing results of sterilization by irradiation with those when heat is used in the conventional way, Dr. Robert A. Gillies of the University of Michigan reported his conclusions to the American Chemical Society meeting in Cincinnati. He stated that in his experiments both yields and rates of fermentation were substantially reduced when these organisms were grown in solutions which had been exposed to the rays.

But irradiation of either malt sprout nutrients or corn steep liquor, for the purpose of killing unwanted organisms, Dr. Gillies said, and subsequent mixing of this sterilized material into the solution used to grow the wanted cultures gave better yields than if the nutrients had been sterilized by heat.

How strange sugars are formed in small percentages which may add up to many pounds total production were also described to the division of carbohydrate chemistry by Dr. Nelson K. Richtmyer of the National Institutes of Health, Bethesda, Md. While only one percent to two percent of the sugar formed by hydrolyzing starch comes out as anything but the usual dextrose, the rarer sugars produced from tons of starch amount to a considerable quantity.

Sedoheptulose, recently found among the products of photosynthesis in plants, is one of the rare sugars studied by Dr. Richtmyer. Forming no crystals itself, this growth sugar is recognized by beautiful crystals formed by the anhydride made from it.

Chemical relatives of dextrose vary as the chords of a musical scale, Dr. Richtmyer stated, illustrating how 16 rearrangements of six carbon atoms can produce 16 different kinds of sugar, all different but similar to ordinary dextrose. Other rearrangements can produce a variety of other sugars built of seven carbon atoms, of which sedoheptulose is one.

Chemical balance between calcium and fat in the blood may be an important factor in clot formation, Dr. Herbert L. Davis and Nora L. Davis of Wayne County General Hospital, Eloise, Mich., reported to the group. When little calcium is present, they find, addition of fat or oil to blood samples speeds up the rate of clotting. Change in the amount of fat in the blood may be a cause of thrombosis, resulting in "stroke," in persons under unusual stress, the team reports.

Science News Letter, April 9, 1955

ASTRONOMY

Faint Comet Spotted In Constellation Leo

➤ A VERY faint comet has been spotted in the constellation of Leo, the lion, now directly overhead, by Robert G. Harrington and G. O. Abell of Mt. Wilson and Palomar Observatories, Pasadena, Calif., Harvard College Observatory in Cambridge, Mass., reported.

The object, of magniture 17, was found on March 22 during the National Geographic-Palomar Observatory Sky Survey. News of its discovery was sent to observatories by Harvard College Observatory, clearing house for astronomical information.

Science News Letter, April 9, 1955

BOTANY

NATURE RAMBLINGS

Lady's Slipper

➤ "CAPRICIOUS BEAUTY" is the meaning assigned to the lady's slipper in the sentimental language of flowers set forth in an old-fashioned "Flora's Lexicon" of three generations ago.

The beauty has a proper right to be capricious if she chooses, for the lady to whom the slipper classically belongs is the Lady Venus herself. Cypripedium is the name in the botany books; the last half, pedium, means a slipper and Cypris is one of the names of the most famous heart-wrecker on Olympus.

Our native lady's slipper species have a right to hold up their heads on another count also, for they are a near relative of the gorgeous exotic orchids, demanded as tribute by present-day capricious beauties, and although less bizarre in shape, they are not at all behind their tropical cousins in delicacy and beauty of coloring.

The most common species is a beautiful clear pink, with occasional albino specimens that are pure white, but there is also a species that is fairly frequently found, with the slipper part a bright yellow and the twisted "strings" in yellowish brown.

The beauty of the lady's slipper has been appreciated not wisely and far too well by persons who have not been content to visit it in its native woods and bog-lands and let it alone there to raise its succeeding, slow-growing generation. They have ripped it up by the roots in great clumps, or even worse and more idly, have given blood-money to men who murder beautiful things for pay.

The flowers invariably avenge this ravishment by dying very quickly in the alien soil where they are set, with the consequence that in the more accessible lands around the cities at least, the lady's slipper is becoming more and more of a rarity.

Our grandchildren, perhaps even we ourselves in our old age, will have to make pilgrimages to hidden fastnesses of swamp or mountain to see this capricious beauty, the lady's slipper.

Science News Letter, April 9, 1955

Questions

ELECTRONICS—What development makes robot radar stations possible? p. 233.

□ □ □

MEDICINE—Why are vaccines not 100% perfect? p. 229.

□ □ □

NUTRITION—How can underweight babies be made to gain weight? p. 228.

□ □ □

TECHNOLOGY—What are the most common places for installing a wire tap? p. 226.

□ □ □

VIROLOGY—How many viruses are needed for a single infection? p. 233.

□ □ □

Photographs: Cover, Fremont Davis; p. 227, U. S. Army; p. 229, Hamilton Wright; p. 231, General Electric; p. 240, Marsh Photographers, Inc.

CHEMISTRY

Protein Compound May Start Cancers

➤ A COMBINATION of protein change and some unknown factor in the cancer cell is believed responsible for loss of control in cell growth that causes cancer, Dr. James A. Miller of the McArdle Memorial Laboratory at the University of Wisconsin, Madison, Wis., told the American Chemical Society in Cincinnati.

"Whatever is the alteration from normal," Dr. Miller said, "it appears to be both irreversible and heritable. Such characteristics are almost certainly the result of changes in proteins or nucleic acids or both."

Dr. Miller has found that certain dyes known to cause cancer combine with proteins in the liver in such a way as to make these proteins useless to the body. Loss of the growth-control substance may be similarly caused by chemical combination, he said.

Science News Letter, April 9, 1955

Kodak reports to laboratories on:

our 50¢ worth on spectrography . . . making candy dandy longer

Spectral wisdom

Let drop a hint that your budget provides for a new spectrograph and shortly you will make several new friends who happen to represent leading manufacturers of laboratory instrumentation. They will be knowledgeable fellows brimming with ideas for making spectrography quicker, easier, less costly, and more significant. Plates and films won't be mentioned in much detail. It will be assumed that somebody up in Rochester, N. Y., will, in the course of frying other fish, toss off a little sensitized goods suitable for use in these instruments. After all, what author concerns himself with the paper on which he puts down his thoughts?

The metaphor, if so drawn, is unfair. For better or worse, a serious spectrographer can never consider plates and film as purely passive media. He has learned many facts about the subtle interactions between the exposing radiation, the emulsion, the latent image, the processing parameters, and the viewing light; but there is always the problem of passing his wisdom on to the young and impatient who have so many other things to learn.

Let him therefore spend half a buck for a copy of the new Second Edition of the data book "Kodak Materials for Spectrum Analysis," which brings straight from the horse's mouth the late word on specific characteristics of these products of ours, as well as general background on their behavior and handling.

There *are* changes. We make what we hope are small improvements in spectral distribution of sensitivity, for example. Though few of them have been big enough to rush into print with, they have piled up in the decade that has gone by since the First Edition of the celebrated little booklet appeared. Now we have brought matters as up to date as they'll ever be and have added some succinct new material on photographic adjacency effects and the relationship between resolving power, sharpness, and granularity. Perhaps it wouldn't hurt even you to look it over.

If your Kodak dealer doesn't have the new edition of "Kodak Materials for Spectrum Analysis," he can sure enough order it for you.

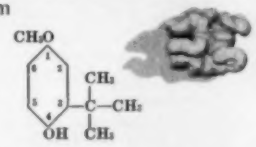
Nuts

Nuts are about 60% oil or fat. Some varieties of pecans run as high as 76% fat.

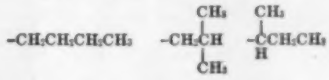
After a while the fat goes bad, as oxygen from the air attacks some of the fatty acid chains that contain double bonds. Wiser heads than ours continue to debate the details of this phenomenon, that one might suppose to be well understood by now. We, rather, regard ourselves as experts on what to do about it and maintain the only laboratory we know of devoted wholly to food antioxidants.

These antioxidants act by breaking a vicious circle. Atmospheric oxygen, according to the most widely held view, attaches itself at or near a double bond and in so doing becomes more active than free O_2. First chance it gets, it takes off to attack another double-bonded molecule, leaving the preceding one to fall apart in foul-tasting ruins. As long, however, as there is antioxidant left on the scene to absorb the brunt of the activated oxygen onslaught, exponential build-up of deterioration is stayed.

Right now we are wooing the nut business (direct and in candy) with talk of wrapping materials, roasting oils, and treated salt all containing small quantities of antioxidants of the form



This is butylated hydroxyanisole. That position 3 for the butyl group is more active than position 2. The three alternative arrangements of the butyl group



are much less effective than the tertiary arrangement. But if one replaces the CH_3O with a CH_3 and puts a second tertiary butyl group at the adjacent position on the ring on the other side of the hydroxyl, one has butylated hydroxytoluene, another excellent food antioxidant. In some cases a combination of both BHA and BHT provides the greatest protection against rancidity. The reasons behind these observations might make challenging exercises in several disciplines.

"Nuts," say the nut men and the candy men (who care little about steric hindrance), "that can keep that crunchy, fresh-from-the-roaster goodness in chocolate bars after 120 days in the warehouse, the trucks, and the coin machines are a better proposition than nuts that go bad in 45 days."

So they write to Eastman Chemical Products, Inc., Kingsport, Tenn., and ask for a list of packaging and food fat houses that supply Tenox*-treated goods. Or, if they want to get into it a little deeper, they ask which* Tenox *antioxidant best fits their cooking temperatures, ingredients, storage, etc.* "Tenox"—*that's our trade-mark for various formulations of BHA, BHT, the synergistic antioxidant propyl gallate, and cation-sequestering citric acid—wholesome substances all.*

Price quoted is subject to change without notice.

This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are . . . *serving laboratories everywhere*

Kodak

• New Machines and Gadgets •

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 773. To receive this Gadget Bulletin without special request each week, remit $1.50 for one year's subscription.

ANTI-STATIC SPRAY in an aerosol container eliminates shocks from static charges in wool and many synthetic fabrics used in the home, automobiles and at work. A 12-ounce container provides anti-shock treatment for 50 square yards and its effectiveness lasts for three months.

Science News Letter, April 9, 1955

FLEXIBLE DUSTPAN can also double as a crumb tray. Made of a plastic in red or yellow that will not break, rust, dent or scratch floors, dust and dirt are trapped in concentric ribs of the pan until emptied. Light hand pressure on the pan forms convenient scoop.

Science News Letter, April 9, 1955

ELECTRIC SANDER offers two sanding motions, a 3/16 inch orbital for fast cutting and a back and fourth reciprocal for smooth, finished work. Proper paper for each motion is applied by pushbutton change. Weighing only five pounds, sander is described as useful on walls and ceilings.

Science News Letter, April 9, 1955

BACKYARD HELICOPTER for the pint-size pilot replaces the dump trucks of earth-borne generations past. This sidewalk toy, shown in the photograph, is complete

with two-blade, free moving rotor made of tubular steel that forms a "crash protector" for the cockpit. The rudder turns with the steering wheel and the young pilot "flys" his craft with chain-driven foot pedals.

Science News Letter, April 9, 1955

PASTE SOLDER is squeezed on the area to be repaired from a plastic tube. The areas adjacent to it are heated and the job done. Ideal for the home craftsman, soldering wires or small pieces of jewelry can be done with the heat from a match or cigarette lighter. For most jobs cleaning tools are eliminated.

Science News Letter, April 9, 1955

FUR COAT cleaner permits owners to safely clean their own fur coats, scarves and jackets for home storage. The cleaner-lusterizer is sprayed from a distance of 10 to 18 inches and a clean cloth is used to wipe away dirt. Allowed to dry for 10 minutes, the coat can then be brushed and stored. One aerosol can cleans a full-length, 47-inch, coat four times.

Science News Letter, April 9, 1955

WATER-DILUTABLE SILICONE treatment gives maximum scratch resistance to glass, porcelain and china. Forming an invisible, non-oily film, the treatment is applied by dipping, flooding or spraying with conventional equipment. Air-drying at room temperature for 24 hours or curing for 10 minutes at 212 degrees Fahrenheit gives optimum protection.

Science News Letter, April 9, 1955

LEATHER KEY case for holding duplicate keys to house, office or car, folds into compact wallet insert. Available in six- or 12-key size, the key holder is practical for coins too and can be carried in the pocket of bathing trunks or sport shorts.

Science News Letter, April 9, 1955

Do You Know?

Virtually no *oil* wells have been drilled in Africa but the continent has rich coal deposits.

To measure *rainfall* in mountainous areas the rain gauges should be tilted at right angles to the ground below, a study showed.

Every state in the United States has at least one variety of *termite;* Arizona has 19, Texas 17, California 15 and Florida 13.

Creosote, a substance distilled from coal tar, is one of the most effective toxic chemicals used for preserving wood and has been in continuous use for more than 100 years.

Cancer tissue can be made to glow a bright red under ultraviolet light when a powder called hematoporphyrin is introduced intravenously before surgery.

Science News Letter, April 9, 1955